



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A61B 17/064, 17/06		A3	(11) International Publication Number: WO 99/62406
			(43) International Publication Date: 9 December 1999 (09.12.99)
(21) International Application Number: PCT/US99/12566		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).	
(22) International Filing Date: 3 June 1999 (03.06.99)		Published With international search report.	
(30) Priority Data: 09/089,884 3 June 1998 (03.06.98) US 09/260,623 1 March 1999 (01.03.99) US		(88) Date of publication of the international search report: 27 April 2000 (27.04.00)	
(71) Applicant (for all designated States except US): COALESCENT SURGICAL, INC. [US/US]; 559 East Weddell Drive, Sunnyvale, CA 94089 (US).			
(72) Inventors; and (75) Inventors/Applicants (for US only): SCHALLER, Laurent [CH/US]; 595 Benvenue Avenue, Los Altos, CA 94024 (US). GARDINER, Barry [US/US]; 13 Charles Hill Road, Orinda, CA 94563 (US). GANDIONCO, Isidro, Matias [US/US]; 36520 Alder Court, Fremont, CA 94536 (US). NGUYEN, John [US/US]; 4053 Forestwood Drive, San Jose, CA 95121 (US). HILL, Art [US/US]; 2000 Broadway #512, San Francisco, CA 94115 (US). HO, Liem [VN/US]; 2235 California Street #158, Mountain View, CA 94040 (US).			
(74) Agents: MACEY, Harry, J. et al.; Morrison & Foerster LLP, 755 Page Mill Road, Palo Alto, CA 94304-1018 (US).			
(54) Title: TISSUE CONNECTOR APPARATUS AND METHODS			
(57) Abstract			
<p>A tissue connector assembly having a flexible member and a surgical fastener such as a surgical clip releaseably coupled to the flexible member. A needle may be secured to one end portion of the flexible member with the surgical clip coupled to the other end portion of the flexible member. A locking device may be used to releaseably couple the flexible member to the surgical clip. The tissue connector assembly may have one or more piercing members, each releaseably coupled to the surgical fastener. A flexible member such as a suture may be used to couple one or both piercing members to respective ends of the fastener.</p>			

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

INTERNATIONAL SEARCH REPORT

Inter. Appl. No.

PCT/US 99/12566

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A61B17/064 A61B17/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 242 456 A (NASH) 7 September 1993 (1993-09-07)	1
A	figures 15,24 ---	25,79
X	EP 0 641 546 A (ETHICON) 8 March 1995 (1995-03-08)	1
	figure 18 ---	
X	US 5 374 268 A (SANDER) 20 December 1994 (1994-12-20)	44,50, 52,53
A	column 3, last paragraph; figures 1,2,4,6 ---	54
X	WO 97 32526 A (YOON) 12 September 1997 (1997-09-12)	1,7,9, 10,12, 13,15,16
A	figures 4A,16,25,35 ---	51,71
	-/--	



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

26 January 2000

Date of mailing of the international search report

17.02.2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Barton, S

INTERNATIONAL SEARCH REPORT

Inter. Patent Application No

PCT/US 99/12566

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 002 563 A (PYKA) 26 March 1991 (1991-03-26) column 5, line 10 - line 12; figures 4,5 ---	1,25,79
A	US 3 958 576 A (KOMIYA) 25 May 1976 (1976-05-25) figure 1 ---	1,25,79
A	US 5 609 608 A (UNIV CALIFORNIA) 11 March 1997 (1997-03-11) figure 6 ---	23
A	DE 195 47 617 C (NEUS MALTE) 18 September 1997 (1997-09-18) figures 4,9 ---	23
A	US 4 586 502 A (BEDI) 6 May 1986 (1986-05-06) ---	
A	DE 219 999 C (KRATZ) figure ---	
A	US 3 249 104 A (HOHNSTEIN) 3 May 1966 (1966-05-03) -----	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 99/12566

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 30-40, 119-125
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
1-29, 44-112
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-22,25-29,79-112

Tissue connector assembly with releasably coupled needle/suture combination and surgical clip

2. Claims: 23,24

Needle/suture combination with locking device

3. Claims: 44-78

Surgical fastener with double piercing member

4. Claims: 113-115

Connection means using compressed tube

5. Claim : 116

Connection means with interlocking grooves and projections

6. Claim : 117

Connection means with knot/constriction

7. Claim : 118

Connector with integral severing means

8. Claims: 126,127

Hollow suture

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/12566

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5242456 A	07-09-1993	AU 2384192 A WO 9309721 A	15-06-1993 27-05-1993
EP 641546 A	08-03-1995	US 5484451 A AU 688341 B AU 7167594 A CA 2131340 A JP 7163576 A US 5573543 A	16-01-1996 12-03-1998 16-03-1995 04-03-1995 27-06-1995 12-11-1996
US 5374268 A	20-12-1994	US 5269783 A CA 2066914 A,C DE 69201400 T EP 0513736 A US 5643319 A	14-12-1993 14-11-1992 13-07-1995 19-11-1992 01-07-1997
WO 9732526 A	12-09-1997	US 5810851 A AU 2137597 A CA 2248122 A EP 0955897 A	22-09-1998 22-09-1997 12-09-1997 17-11-1999
US 5002563 A	26-03-1991	AT 132027 T CA 2076672 A DE 69115892 D DE 69115892 T EP 0516720 A WO 9112771 A	15-01-1996 23-08-1991 08-02-1996 05-09-1996 09-12-1992 05-09-1991
US 3958576 A	25-05-1976	DE 2454371 A	19-06-1975
US 5609608 A	11-03-1997	US 5783130 A US 5722989 A	21-07-1998 03-03-1998
DE 19547617 C	18-09-1997	NONE	
US 4586502 A	06-05-1986	NONE	
DE 219999 C		NONE	
US 3249104 A	03-05-1966	NONE	